Assessment Study of Groundwater Vulnerability to Seawater Intrusion Using Galdit Method in Semarang City

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Abstract

Seashore is an area that has direct boundary to sea; that would increase possibility to seawater intrusion. Indonesia has a many cities that own seashore area; one of them is Semarang. In the last few years seawater intrusion in Semarang has influenced groundwater quality, mainly in north-coast of Semarang. Thus, it is needed a study on intrinsic groundwater vulnerability assessment to seawater intrusion in Semarang city.

One method that is used to study intrinsic groundwater vulnerability assessment to seawater intrusion is GALDIT method, which use hydrogeologically parameter groundwater occurrence (G), Aquifer hydraulic conductivity (A), High groundwater level above sealevel (L), distance from shore (D), Impact of existing status of sea water intrusion in the area (I) and thickness of aquifer (T). Vulnerability assessment method is done by assessing weight and ratings from each parameter. The result from the assessment then calculated to be GALDIT index. The result of GALDIT index is then classified based on vulnerability rate.

GALDIT method parameters in the study area which were used to assess groundwater occurrence were confined and unconfined aquifer, hydraulic conductivity index was 0.2 to 8.3 m/day, groundwater level elevation was 0.3 to 4.4 metres, distance from shore was less than 5400 metres, TDS index was 175 to 2000 ppm and thickness of aquifer was 2 to 35 metres. GALDIT index which calculated was 45 to 125. The intrinsic vulnerability rate which were assessed in the study area which classified from GALDIT index were very high in Tambakmulyo area, high in North Semarang area, moderate in North and Easth Semarang area, low in all district, and very low in South and Middle Semarang. The efforts that could be done to prevent from seawater intrusion were making injection well in shore area, used alternative water source, making a control of well and replanting the shore area.

Keywords: Semarang city, GALDIT method, Seawater intrusion vulnerability